09/914920
5CO

PATENT COOPERATION TREATY

PCT

From the INTERNATIONAL BUREAU

To:

BOWDERY, Anthony, Oliver
Qinetiq Limited
IP Formalities
A4 Building, Cody Technology Park
Ively Road
Farnborough, Hants GU14 0LX
ROYAUME-UNI

NOTIFICATION OF THE RECORDING OF A CHANGE

(PCT Rule 92bis.1 and Administrative Instructions, Section 422)

Date of mailing (day/month/year)
30 octobre 2001 (30.10.01)

Applicant's or agent's file reference
JL2392

IMPORTANT NOTIFICATION

International application No.
PCT/GB00/00753

International filing date (day/month/year)
03 mars 2000 (03.03.00)

1. The following indications appeared on record concerning:

[X] the applicant [ ] the inventor [ ] the agent [ ] the common representative

Name and Address
THE SECRETARY OF STATE FOR DEFENCE
Defence Evaluation and Research
Agency
Farnborough
Hampshire GU14 0LX
United Kingdom

State of Nationality: GB
State of Residence: GB
Telephone No.:
Facsimile No.:
Teleprinter No.:

2. The International Bureau hereby notifies the applicant that the following change has been recorded concerning:

[X] the person [ ] the name [ ] the address [ ] the nationality [ ] the residence

Name and Address
QUINETIQ LIMITED
85 Buckingham Gate
London SW1 6TD
United Kingdom

State of Nationality: GB
State of Residence: GB
Telephone No.:
Facsimile No.:
Teleprinter No.:

3. Further observations, if necessary:
Agent's address changed accordingly.

4. A copy of this notification has been sent to:

[X] the receiving Office
[ ] the International Searching Authority
[ ] the International Preliminary Examining Authority
[ ] the designated Offices concerned
[X] the elected Offices concerned
[ ] other:

The International Bureau of WIPO
34, chemin des Colombettes
1211 Geneva 20, Switzerland

Facsimile No.: (41-22) 740 14 35

Authorized officer
R. Raissi

Telephone No.: (41-22) 338 83 38

PATENT COOPERATION TREATY

From the INTERNATIONAL BUREAU

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NOTIFICATION OF ELECTION

(PCT Rule 61.2)

To:

Assistant Commissioner for Patents
United States Patent and Trademark Office
Box PCT
Washington, D.C.20231
ETATS-UNIS D'AMERIQUE

in its capacity as elected Office

Date of mailing (day/month/year) 23 October 2000 (23.10.00)	
International application No. PCT/GB00/00753	**Applicant's or agent's file reference** JL2392
International filing date (day/month/year) 03 March 2000 (03.03.00)	**Priority date** (day/month/year) 06 March 1999 (06.03.99)
Applicant DONOHUE, Paul, Peter et al	

1. The designated Office is hereby notified of its election made:

[X] in the demand filed with the International Preliminary Examining Authority on:

20 September 2000 (20.09.00)

[ ] in a notice effecting later election filed with the International Bureau on:

2. The election [X] was

[ ] was not

made before the expiration of 19 months from the priority date or, where Rule 32 applies, within the time limit under Rule 32.2(b).

The International Bureau of WIPO
34, chemin des Colombettes
1211 Geneva 20, Switzerland

Facsimile No.: (41-22) 740 14 35

Authorized officer

Zakaria EL KHODARY

Telephone No.: (41-22) 338 83 38

PATENT COOPERATION TREATY

PCT

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference	**FOR FURTHER ACTION** see Notification of Transmittal of International Search Report (Form PCT/ISA/220) as well as, where applicable, item 5 below.	
JL2392		
International application No.	International filing date *(day/month/year)*	(Earliest) Priority Date *(day/month/year)*
PCT/GB 00/ 00753	03/03/2000	06/03/1999
Applicant		
THE SECRETARY OF STATE FOR DEFENCE DEFENCE EVALUAT		

This International Search Report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This International Search Report consists of a total of 3 sheets.

[X] It is also accompanied by a copy of each prior art document cited in this report.

1. **Basis of the report**

   a. With regard to the **language**, the international search was carried out on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.

   [ ] the international search was carried out on the basis of a translation of the international application furnished to this Authority (Rule 23.1(b)).

   b. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international search was carried out on the basis of the sequence listing :

   [ ] contained in the international application in written form.

   [ ] filed together with the international application in computer readable form.

   [ ] furnished subsequently to this Authority in written form.

   [ ] furnished subsequently to this Authority in computer readble form.

   [ ] the statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.

   [ ] the statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished

2. [ ] **Certain claims were found unsearchable** (See Box I).

3. [ ] **Unity of invention is lacking** (see Box II).

4. With regard to the **title,**

   [X] the text is approved as submitted by the applicant.

   [ ] the text has been established by this Authority to read as follows:

5. With regard to the **abstract,**

   [X] the text is approved as submitted by the applicant.

   [ ] the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box III. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. The figure of the **drawings** to be published with the abstract is Figure No. 5

   [X] as suggested by the applicant.

   [ ] because the applicant failed to suggest a figure.

   [ ] because this figure better characterizes the invention.

   [ ] None of the figures.

INTERNATIONAL SEARCH REPORT

International Application No
PCT/GB 00/00753

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 H01L21/316 H01L21/3105

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 H01L

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)
EPO-Internal, PAJ, WPI Data, INSPEC, IBM-TDB

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5 310 990 A (RUSSELL STEPHEN D ET AL) 10 May 1994 (1994-05-10)	24,25
A	column 6, line 45 -column 8, line 8	1-5,15, 26
A	US 5 626 670 A (VARSHNEY USHA ET AL) 6 May 1997 (1997-05-06) column 3, line 55 -column 4, line 34	1,15, 24-26

-/--

[X] Further documents are listed in the continuation of box C.

[X] Patent family members are listed in annex.

° Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
11 July 2000	25/07/2000

Name and mailing address of the ISA	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	Königstein, C

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Form PCT/ISA/210 (second sheet) (July 1992)

INTERNATIONAL SEARCH REPORT

International Application No
PC[redacted]B 00/00753

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	MARTINEZ O E ET AL: "MAGNIFIED EXPANSION AND COMPRESSION OF SUBPICOSECOND PULSES FROM A FREQUENCY-DOUBLED ND:YLF LASER" IEEE JOURNAL OF QUANTUM ELECTRONICS,US,IEEE INC. NEW YORK, vol. 25, no. 10, 1 October 1989 (1989-10-01), pages 2124-2128, XP000084393 ISSN: 0018-9197 figure 2 ---	
A	MATSUI Y ET AL: "Laser annealing to produce ferroelectric-phase PbTiO/sub 3/ thin films" JOURNAL OF APPLIED PHYSICS, AUG. 1981, USA, vol. 52, no. 8, pages 5107-5111, XP000915305 ISSN: 0021-8979 the whole document -----	

1

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No
P[redacted]/GB 00/00753

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 5310990 A	10-05-1994	NONE	
US 5626670 A	06-05-1997	NONE	

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PATENT COOPERATION TREATY

PCT

REC'D 26 JUN 2001
WIPO PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference	FOR FURTHER ACTION	See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)
JL2392		
International application No.	International filing date *(day/month/year)*	Priority date *(day/month/year)*
PCT/GB00/00753	03/03/2000	06/03/1999
International Patent Classification (IPC) or national classification and IPC H01L21/316		
Applicant THE SECRETARY OF STATE FOR DEFENCE DEFENCE EVALUAT		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 4 sheets, including this cover sheet.

   ☒ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

   These annexes consist of a total of 5 sheets.

3. This report contains indications relating to the following items:

   - I ☒ Basis of the report
   - II ☐ Priority
   - III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
   - IV ☐ Lack of unity of invention
   - V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations suporting such statement
   - VI ☐ Certain documents cited
   - VII ☒ Certain defects in the international application
   - VIII ☒ Certain observations on the international application

Date of submission of the demand	Date of completion of this report
20/09/2000	22.06.2001
Name and mailing address of the international preliminary examining authority: European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Authorized officer Boetticher, H Telephone No. +49 89 2399 2682

Form PCT/IPEA/409 (cover sheet) (January 1994)

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/GB00/00753

I. Basis of the report

1. With regard to the **elements** of the international application *(Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17))*:
Description, pages:

1-24	as originally filed				

Claims, No.:

1-23	as received on	03/03/2001	with letter of	27/02/2001	

Drawings, sheets:

1/6-6/6	as originally filed				

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

   These elements were available or furnished to this Authority in the following language: , which is:

   - ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
   - ☐ the language of publication of the international application (under Rule 48.3(b)).
   - ☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

   - ☐ contained in the international application in written form.
   - ☐ filed together with the international application in computer readable form.
   - ☐ furnished subsequently to this Authority in written form.
   - ☐ furnished subsequently to this Authority in computer readable form.
   - ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
   - ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

   - ☐ the description, pages:
   - ☐ the claims, Nos.:

☐ the drawings, sheets:

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)):

(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)

6. Additional observations, if necessary:

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes:	Claims	1-23
	No:	Claims	
Inventive step (IS)	Yes:	Claims	7,11-13
	No:	Claims	1-6,8-10, 14-23
Industrial applicability (IA)	Yes:	Claims	1-23
	No:	Claims	

2. Citations and explanations
see separate sheet

VII. Certain defects in the international application

The following defects in the form or contents of the international application have been noted:
see separate sheet

VIII. Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:
see separate sheet

to item V:

Document D1: US-A-5 310 990 shows a method of laser processing ferroelectric materials wherein a layer of a ferroelectric precursor is illuminated with a pulse of energy having a first temporal width to convert the layer material into a phase capable of exhibiting ferroelectricity, see e.g. the abstract of D1. The method of present claim 1 mainly differs from this known method in that the first temporal width of the pulse is extended by passing it through a temporal extender to produce a pulse having a greater temporal width. It is noticed that D1 discloses pulse durations of at least 10 ns (see column 4 line 35) and of about 25 ns (see column 6 line 5). A skilled person wishing to check the disclosure of D1 would thus need a source for pulses of 10 ns and for 25 ns. A temporal extender to get 25 ns pulses out of a 10 ns source is one of the possibilities which may be selected in accordance with circumstances without any inventive skill being involved. It is noted that according to column 6 lines 31 to 37 of D1, pulse length is one the critical parameters, so means for varying pulse length in order to find the optimum pulse length are implicitly taught by D1.

Thus, the method of claim 1 is obvious in view of the disclosure of D1. The above objections also apply to apparatus claim 15, since pulse generating means and guide means to guide the pulses onto the layer to be processed are implicit in D1. The device of claim 23 directly results from the obvious method of claim 1.

Except for the subject matter of dependent claims 7 or 11, the features of the dependent method and apparatus claims are obvious from D1. As regards claim 7, a temporal length of 300 ns seems to be not derivable from D1 disclosing 10 ns and 25 ns pulses. As to claim 11, two sources of pulses are not shown in D1.

to item VII:

The description is not in conformity with the claims, does not identify document D1 and does not mention the relevant background art shown in D1.

to item VIII:

Claim 23 is unclear, because a method feature - that a laser pulse is temporarily extended - is used in a device claim.

The Patent Office

INVESTOR IN PEOPLE

Application No: GB 9905098.1 **Examiner:** C.D.Stone
Claims searched: All **Date of search:** 15 June 1999

Patents Act 1977
Search Report under Section 17

Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK Cl (Ed.Q): H1K(KLHA,KLHX)

Int Cl (Ed.6): H01L

Other: ON LINE,W.P.I.

Documents considered to be relevant:

Category	Identity of document and relevant passage		Relevant to claims
X	EP 0199388 A1	PHILIPS	43
X	EP 0114228 A2	I.B.M. (See page 6 lines 26-32)	43
X	US 5626670	A.R.C.	43
X	US 5310990	U.S.A.Sec.of Navy	43
X	US 5219786	SONY	43
X	US 4456490	WESTINGHOUSE	43

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.

PCT INTELLECTUAL PROPERTY ORGANIZATION
International Bureau

INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification 7 : H01L 21/316, 21/3105

A1

(11) International Publication Number: **WO 00/54317**

(43) International Publication Date: 14 September 2000 (14.09.00)

(21) International Application Number: PCT/GB00/00753

(22) International Filing Date: 3 March 2000 (03.03.00)

(30) Priority Data:
9905098.1 6 March 1999 (06.03.99) GB

(71) Applicant *(for all designated States except US)*: THE SECRETARY OF STATE FOR DEFENCE [GB/GB]; Defence Evaluation and Research Agency, Farnborough, Hampshire GU14 0LX (GB).

(72) Inventors; and

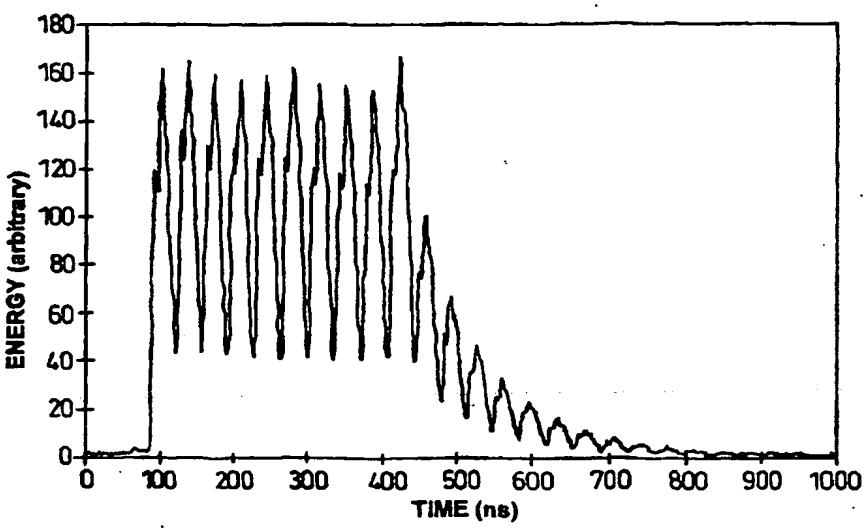
(75) Inventors/Applicants *(for US only)*: DONOHUE, Paul, Peter [GB/GB]; DERA Malvern, St. Andrews Road, Malvern, Worcestshire WR14 3PS (GB). TODD, Michael, Andrew [GB/GB]; DERA Malvern, St. Andrews Road, Malvern, Worcestershire WR14 3PS (GB).

(74) Agent: BARKER BRETTELL; 138 Hagley Road, Edgbaston, Birmingham B16 9PW (GB).

(81) Designated States: AE, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CR, CU, CZ, DE, DK, DM, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).

Published
With international search report.
Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments.

(54) Title: IMPROVEMENTS RELATING TO ANNEALING



(57) Abstract

A method and apparatus for annealing an integrated ferroelectric device (10) is disclosed in which the device (10) comprises a first layer of material capable of existing in a ferroelectric state and a second layer of material defining an integrated circuit below the first layer such as a microbridge thermal detector. The method comprises producing a pulse of energy, extending the pulse temporally using a pulse extender (200) and illuminating the first layer with the extended pulse. The duration and wavelength and fluence of the extended pulse are selected so that the material of the first layer is annealed into a ferroelectric state without exceeding the temperature budget of the integrated circuit. Application of the method in heating other articles which comprise a layer to be heated and a temperature sensitive layer is also disclosed. By extending the temporal width of the pulse, energy is supplied at a rate which ensures a more even heating of the first layer without damaging the temperature sensitive layer over time.

FOR THE PURPOSES OF INFORMATION ONLY

Codes used to identify States party to the PCT on the front pages of pamphlets publishing international applications under the PCT.

AL	Albania	**ES**	Spain	**LS**	Lesotho	**SI**	Slovenia
AM	Armenia	**FI**	Finland	**LT**	Lithuania	**SK**	Slovakia
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DE	Germany	**LI**	Liechtenstein	**SD**	Sudan		
DK	Denmark	**LK**	Sri Lanka	**SE**	Sweden		
EE	Estonia	**LR**	Liberia	**SG**	Singapore		

INTERNATIONAL SEARCH REPORT

International Application No
PCT/GB 00/00753

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 H01L21/316 H01L21/3105

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 H01L

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)
EPO-Internal, PAJ, WPI Data, INSPEC, IBM-TDB

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5 310 990 A (RUSSELL STEPHEN D ET AL) 10 May 1994 (1994-05-10)	24,25
A	column 6, line 45 -column 8, line 8	1-5,15, 26

A	US 5 626 670 A (VARSHNEY USHA ET AL) 6 May 1997 (1997-05-06) column 3, line 55 -column 4, line 34	1,15, 24-26

	-/--	

[X] Further documents are listed in the continuation of box C.

[X] Patent family members are listed in annex.

° Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
11 July 2000	25/07/2000

Name and mailing address of the ISA	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	Königstein, C

Form PCT/ISA/210 (second sheet) (July 1992)

CLAIMS

1. A method of producing an integrated ferroelectric device (10) comprising a first layer of material capable of existing in a ferroelectric state and a second layer of material defining an integrated circuit, the method comprising the steps of:

producing (100) a pulse of energy having a first temporal width;

extending the temporal width of said pulse by passing it through a temporal extender (200) to produce a processed pulse having a greater temporal width; and

illuminating the first layer with said processed pulse to convert some or all of the material in the first layer from a non-ferroelectric state into a phase capable of exhibiting ferroelectricity or otherwise improving the quality of the material of the first layer without exceeding the temperature budget of the integrated circuit of said second layer.

2. A method according to claim 1 which further comprises generating a number of such processed pulses and sequentially illuminating the device (10) with said pulses.

3. A method according to claim 1 or claim 2 in which the material of the first layer comprises a low grade deposited perovskite and the method improves the quality of the perovskite material.

4. A method according to claim 1 or claim 2 in which the first layer comprises material deposited substantially in a non-perovskite phase and the method converts some or all of the material into the perovskite phase.

5. A method according to any preceding claim in which the pulse of energy comprises a pulse of energy produced using a laser (100).

6. A method according to claim 5 in which the pulse produced by the laser (100) has a temporal length of substantially 10ns, or 20ns or perhaps substantially 25ns, or even beyond or any value within a range of values limited by one or more of the preceding values.

7. A method according to any preceding claim in which the temporal extender increases the temporal length of the pulse to produce a processed pulse with a temporal length of approximately 300ns, or between substantially 300ns and 400ns, or longer.

8. A method according to any preceding claim in which the processed pulse comprises more than one sub-pulse, each sub-pulse corresponding to a pulse action of the extender (200).

9. A method according to any preceding claim in which the processed pulse has a fluence and temporal width that is compatible with the properties of the material of the first layer such that the temperature throughout the layer (or over a substantial depth of the first layer) exceeds a predetermined anneal temperature whilst the temperature of the second layer is within the temperature budget of the circuitry.

10. A method according to any preceding claim in which the first layer comprises the top layer of the device (10).

11. A method according to any preceding claim in which two different sources of energy are produced, each source producing a respective pulse and at least one of said respective pulses being extended by a pulse

extender (200) to produce a processed pulse, and in which the first layer is illuminated by both pulses.

12. A method according to claim 11 in which the layer is illuminated by both pulses substantially simultaneously.

13. A method according to any one of claims 11 or 12 which further comprises providing a metallic layer between the first layer and the second layer and illuminating the first layer with the two different processed pulses.

14. A method according to any preceding claim in which the first layer is illuminated with the processed pulse whilst the ambient temperature of the device is maintained higher than room temperature.

15. An apparatus for producing an integrated ferroelectric device (10), said device comprising at least a first layer of material capable of existing in a perovskite phase and second layer of material defining an integrated circuit, the apparatus comprising:

pulse generating means (100) adapted to generate a pulse of energy having a first temporal width;

pulse extending means (200) adapted to extend the temporal pulse width of said pulse to provide a processed pulse of greater temporal width;

and guide means (210, 220) adapted to guide said processed pulse of energy onto said first layer whereby some or all of the material in the first layer is converted from a non-ferroelectric state into a ferroelectric state or to otherwise improve the quality of the material of the first layer

without exceeding the temperature budget of the integrated circuit of said second layer.

16. Apparatus according to claim 15 which further comprises depositing means for depositing said first layer of material above said second layer in which some or all of said first layer is in a non-perovskite phase.

17. Apparatus according to claim 15 or claim 16 in which the pulse generating means comprises a laser (100).

18. Apparatus according to claim 17 in which the laser (100) has a wavelength in the ultraviolet spectrum.

19. Apparatus according to any one of claims 15 to 17 in which the depositing means is adapted to deposit a first layer of material above the second layer after one or more intermediate layers are deposited onto the second layer.

20. Apparatus according to claim 19 in which one of the intermediate layers comprises a sacrificial layer that is subsequently removed to leave a space between the first and second layers to form a microbridge.

21. Apparatus according to any one of claims 15 to 20 in which the pulse extender is adapted to increase the temporal pulse width of the first pulse by substantially two times or four times, or substantially ten times or more than ten times or any value therebetween.

22. Apparatus according to any one of claims 15 to 21 in which the pulse extender is adapted to produce a processed pulse that comprises a number of sub-pulses, each sub pulse corresponding to the first pulse.

23. Apparatus for producing an integrated ferroelectric device substantially as described herein with reference to the accompanying drawings.

24. An integrated ferroelectric device comprising at least a first layer of ferroelectric material and a second layer comprising an integrated circuit, in which said first layer is transformed into a perovskite phase using a pulse of energy from a laser that has been temporally extended.

25. A method of preferentially heating a first layer of material to a first temperature without heating a second layer of a material provided below said first layer to said first temperature by illuminating the first layer with a temporally extended pulse of radiation from a laser source.

26. Apparatus adapted to heat treat a treatment layer of an article comprising a treatment layer and one or more further layers, comprising a laser adapted to produce a laser pulse, a temporal extender adapted to extend the temporal width of the laser pulse, and means for guiding the temporally extended pulse onto the article, whereby the laser pulse is adapted to raise the temperature of that treatment layer above a treatment temperature T whilst one or more of the further layers are kept substantially below the treatment temperature.